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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/553,847

10/20/2005

Ikutomo Umeoka

2005_1497A

6289

52349 7590 04/17/2009
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EXAMINER

KASTURE, DNYANESH G

ART UNIT

PAPER NUMBER

3746

MAIL DATE

DELIVERY MODE

04/17/2009

PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/553,847	Applicant(s) UMEOKA ET AL.	
	Examiner DNYANESH KASTURE	Art Unit 3746	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 January 2009.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-9 and 14-22 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-9 and 14-22 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 20 October 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on the 26th of January 2009 has been entered.

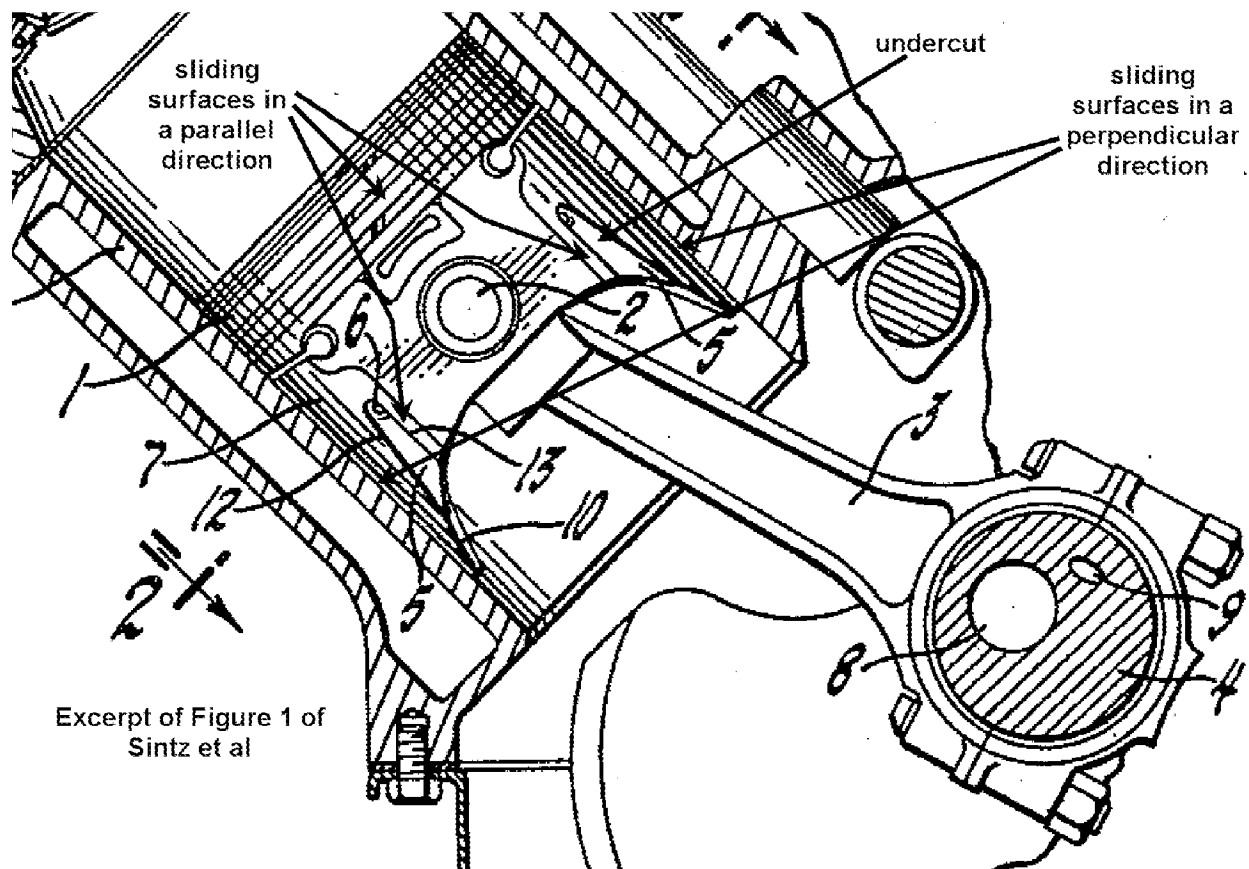
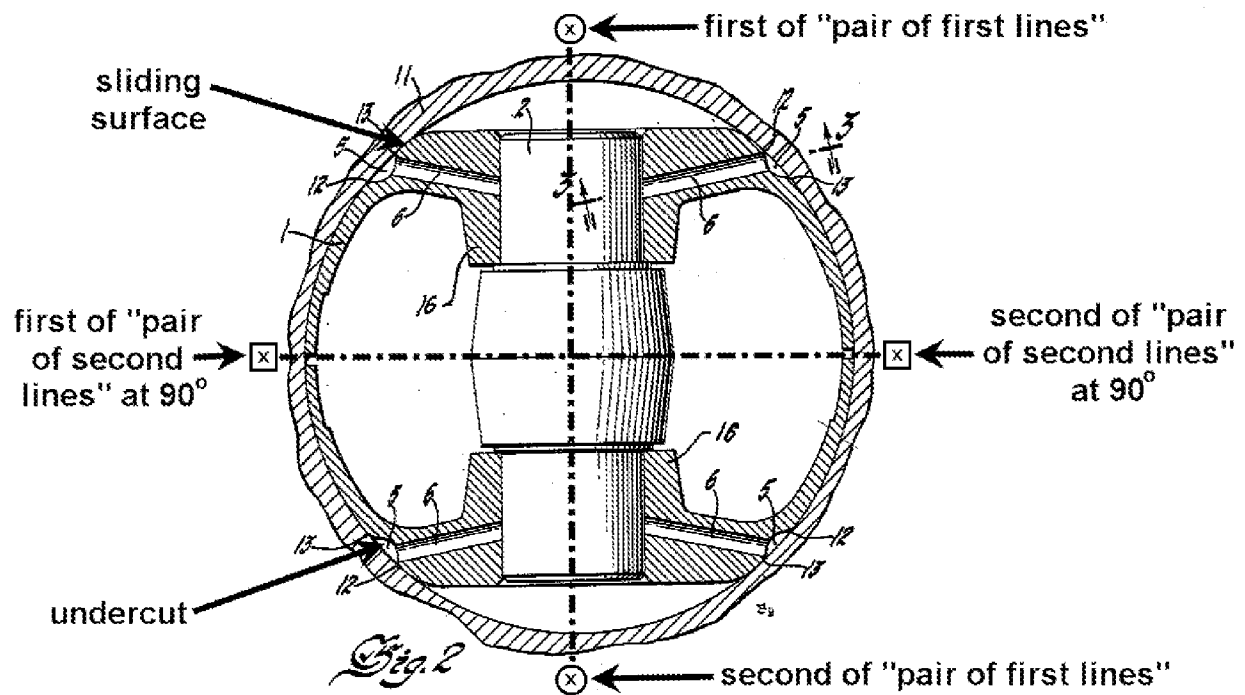
Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1, 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kojima Takeshi (Japanese Patent Publication number JP 2004027969) and in view of Sintz et al (US Patent 2,702,219 A)

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4. In Re claim 1, Kojima discloses a hermetic compressor (abstract) comprising a housing (1) which contains oil and houses a compression mechanism (6) for compressing a refrigerant gas, the compression mechanism comprising:

- a crankshaft (10) disposed in a vertical direction and having a main shaft (11) and an eccentric shaft (12)
- a block (16) forming a cylinder (17) which inherently has an axis
- a piston (20) arranged to reciprocate in the cylinder (17) in a direction of the cylinder axis, the piston inherently having an outer circumferential surface and a top surface as depicted
- a piston pin (22, 122) disposed in the piston (20) such that a center axis of the piston pin is parallel to the eccentric shaft (12)
- a connecting rod (21) for connecting the eccentric shaft (12) to the piston pin
- an oil supplying structure (14) for supplying oil to an outer circumferential surface of the piston (20)
- part of the skirt side of the piston (20) is protruded to the outside of cylinder (16, 17) in the vicinity of the bottom dead center position as depicted in Figure 5

5. However, Kojima does not disclose an undercut configured in a manner set forth in the claim.

6. Nevertheless, with reference to Figures 1 and 2 depicted above, Sintz et al disclose at least one under cut (5) formed in the outer circumferential surface outside a sliding surface thereof existing in a parallel direction (annotated) and a perpendicular direction (annotated) of the piston pin (2), as viewed in an axial direction of the piston;

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- wherein a pair of first lines (annotated) are defined at the outer circumferential surface of the piston so as to be parallel to the piston axis and so as to intersect the center axis of the piston pin, the first lines being respectively defined at mutually diametrically opposite locations of the outer circumferential surface of the piston pin with respect to the piston axis;
- wherein a pair of second lines (annotated) are defined, at the outer circumferential surface of the piston so as to be parallel to the piston axis and so as to be spaced 90° circumferentially from the first lines with respect to the piston axis, the second lines being respectively defined at mutually diametrically opposite locations of the outer circumferential surface of the piston with respect to the piston axis;
- wherein the at least one under cut (there are four – labeled “5”) is formed in the outer circumferential surface of the piston at at least one location of the outer circumferential surface spaced circumferentially away from each of the first lines and each of the second lines as depicted in Figure 2;
- wherein the at least one under cut is separated from the top surface of the piston, because the apex of the undercut is some distance from the top surface
- and at least when the piston is in a bottom dead center position, communicates with space inside the housing because the open end of the undercut is situated at the bottom of the piston.

7. It would have been obvious to a person having ordinary skill in the art at the time of the invention to use the piston of Sintz et al instead of the piston in the compressor of Kojima as an alternate design choice for a piston that lubricates bearing surfaces that

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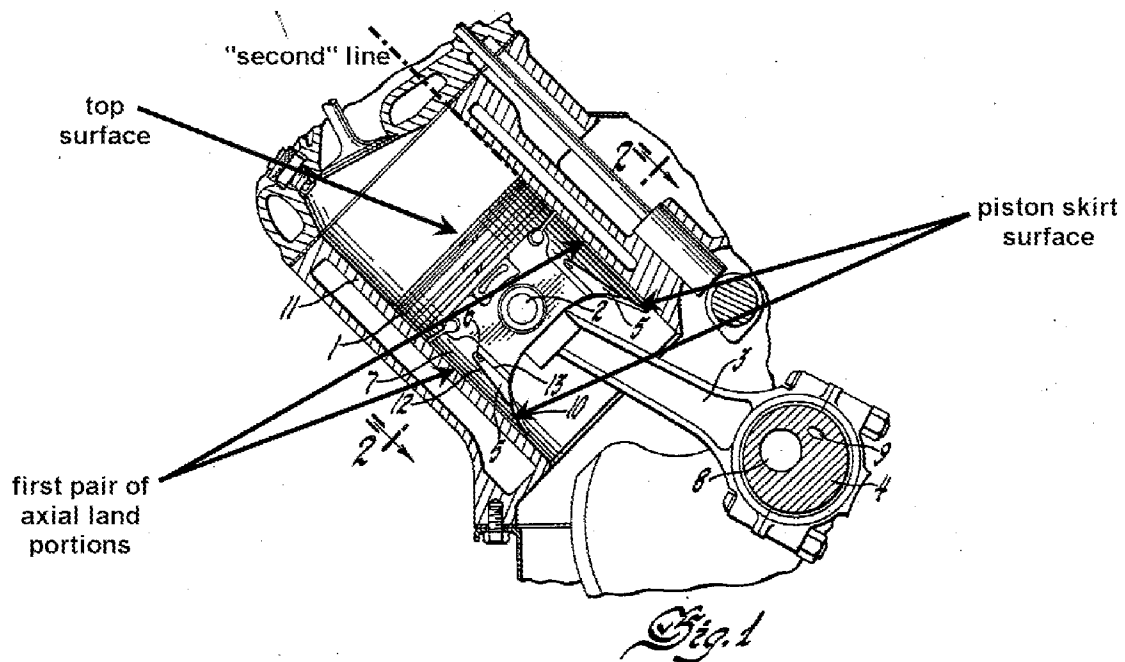
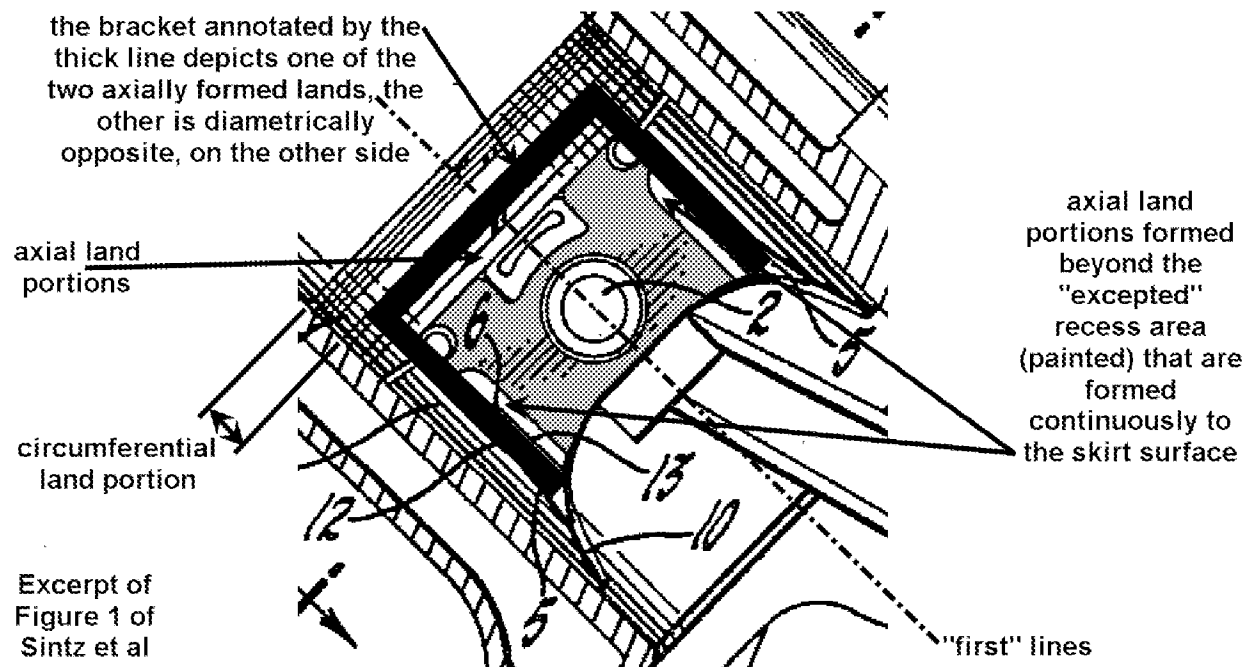
are “not easily lubricated by a force feed lubrication system” as stated in Column 1, Lines 36-37 of Sintz et al.

8. In Re claim 9, Kojima discloses a hermetic compressor (abstract) comprising a housing (1) which contains oil and houses a compression mechanism (6) for compressing a refrigerant gas, the compression mechanism comprising:

- a crankshaft (10) disposed in a vertical direction and having a main shaft (11) and an eccentric shaft (12)
- a block (16) forming a cylinder (17)
- a cylindrical piston (20) arranged to reciprocate in the cylinder (17) in a direction of a cylinder axis
- a piston pin (22, 122) disposed on the piston (20) in a way in which a center axis is in parallel to the eccentric shaft (12)
- a connecting rod (21) for connecting the eccentric shaft (12) to the piston pin, the piston pin and the connecting rod forming the connecting portion
- part of the skirt side of the piston (20) is protruded to the outside of cylinder (16, 17) in the vicinity of the bottom dead center position as depicted in Figure 5

9. However, Kojima does not disclose under cuts and the land surfaces formed as a result with configuration and form as set forth in the claim.

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10. Nevertheless, with reference to excerpt of Figure 1 depicted above, Sintz et al discloses a cylindrical piston with a skirt surface (annotated) at the side of the connecting portion, a top surface as depicted and:

- an outer circumferential surface parallel to the cylinder (11)
- the outer circumferential surface having an under cut (there are four – labeled “5”) and lands (where there is no under cut), where:
 - the undercut is recessed (as depicted) with reference to the outer circumferential surface and the lands are on the same surface as the outer circumferential surface (where there is no undercut), the lands comprising:
 - a circumferential land portion (as annotated) over a predetermined width extending from the top surface towards the skirt surface
 - a first pair of axial land portions (as annotated) formed respectively along the second lines continuously from the circumferential land portion to the skirt surface
 - a second pair of axial land portions (as annotated), the top section of which is formed continuously along the first lines, starting from the circumferential land portion and extending downwards, the bottom two portions (outlined by the two thick annotated vertical lines comprising the added bracket annotation) extend to the skirt surface, the break between the top portion and the bottom two portions is the EXCEPTED painted area (recess) that interrupts the continuity as claimed. Note that the phrase “FOR accommodating the piston pin” is intended purpose/intended use language that does not distinguish the claimed apparatus from the prior art because MPEP 2114 [R-1] states: “MANNER OF OPERATING THE DEVICE DOES NOT DIFFERENTIATE

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APPARATUS CLAIM FROM THE PRIOR ART. A claim containing a recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus if the prior art apparatus teaches all the STRUCTURAL LIMITATIONS of the claim”.

11. It would have been obvious to a person having ordinary skill in the art at the time of the invention to use the piston of Sintz et al instead of the piston in the compressor of Kojima as an alternate design choice for a piston that lubricates bearing surfaces that are “not easily lubricated by a force feed lubrication system” as stated in Column 1, Lines 36-37 of Sintz et al.

12. ALTERNATIVELY, Claims 1 and 9, and Claims 2-6, 14-22 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kojima Takeshi (Japanese Patent Publication number JP 2004027969) and in view of Sintz et al (US Patent 2,702,219 A) and further in view of Thompson (US Patent 3,173,345 A) or Klotz et al (US Patent 5,860,395 A) or Ellermann et al (US Patent 4,599,935 A) or Nigro et al (US Patent 6,112,715 A)

13. In Re claims 1 and 9, Kojima discloses all the claimed limitations except for the undercuts and resulting land surfaces configured in a manner set forth in the claims.

14. Nevertheless, Sintz et al discloses four undercuts configured around the circumference with reference to the piston pin in the same way as applicant's undercuts, as discussed earlier.

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15. In addition, Thompson, Klotz et al, Ellermann and Nigro et al disclose all the claimed piston details (usable as the piston for Kojima) except for the undercuts:

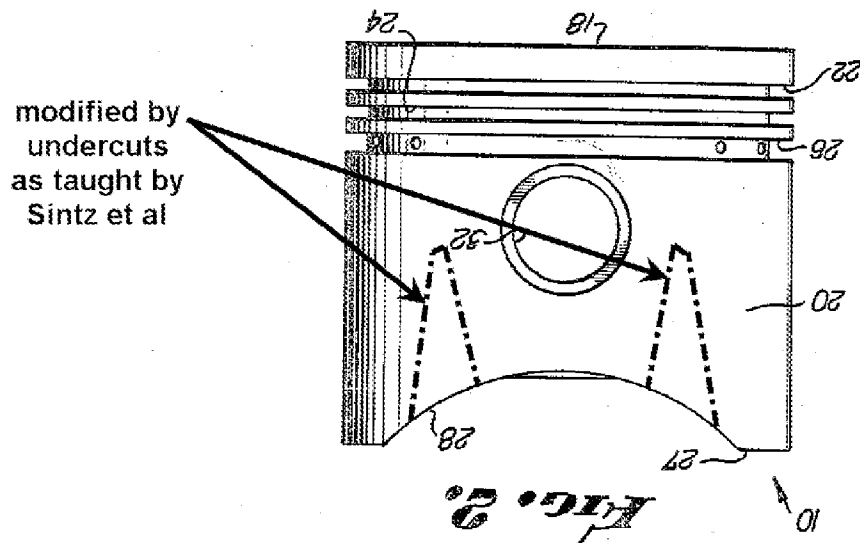


Figure 2 of Thompson

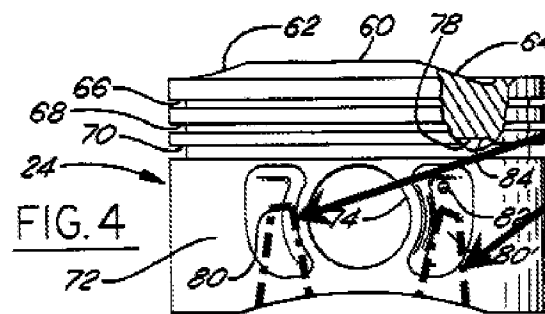
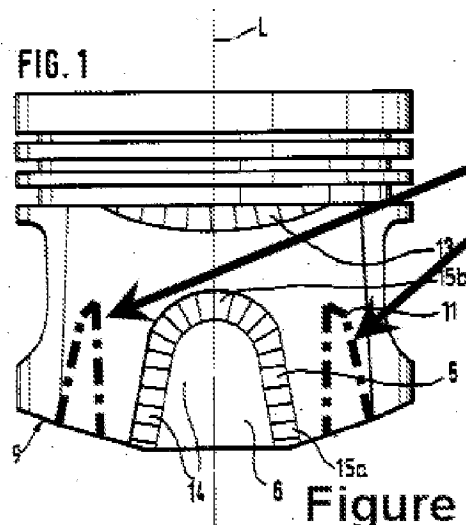


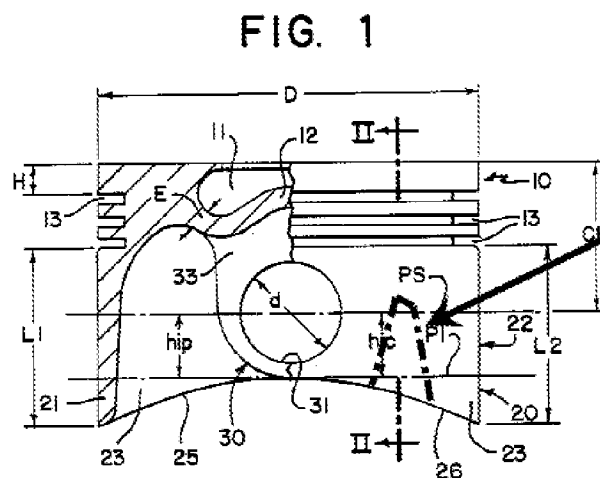
Figure 4 of Klotz et al

alternate design for undercuts (80) of Klotz et al as taught by Sintz et al



modified by
 undercuts as
 taught by
 Sintz et al

Figure 1 of Ellermann et al



modified by
 undercuts as
 taught by
 Sintz et al
 (only one of
 four modified
 undercuts
 shown as
 annotated)

Figure 1 of Nigro et al

16. It would have been obvious to a person having ordinary skill in the art at the time of the invention to modify the piston skirt of Thompson, Klotz et al, Ellermann or Nigro et al so they have four undercuts as taught by Sintz et al for the purpose of providing lubrication directly to the circumferential surface of piston pin through passage (6) as stated by Sintz et al, this modification advantageously lubricates the pin surface directly.

17. In Re claim 2, Sintz et al depicts that four under cuts occupy a substantial area of the circumferential surface, however it does not specifically say that the undercut is no less than half the area. Nevertheless it has been held that discovering an optimum value of a result effective variable involves only routine skill in the art - MPEP 2144.05 (II-B). Kojima modified by Sintz et al as applied to claim 1 discloses all the claimed limitations.

18. In Re claim 3, Ellermann et al depicts an angle β that is acute as depicted which is substantially maintained around the edges of the undercut ending in the skirt surface. The edge of the undercut modification taught by Sintz et al can be designed to have the same angle with the outer circumferential surface.

19. In Re claim 4, Sintz et al depicts the undercut surface (5) is formed continuously to a skirt surface of the piston.

20. In Re claim 5, Ellermann et al depicts the piston having a circumferentially formed land over a predetermined axial width extending axially from the top surface towards the skirt surface, the groove in the circumferentially formed land is also depicted. Sintz et al depicts the same, alternatively Sintz et al can be modified to have the circumferentially formed land and groove as taught by Ellermann et al.

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21. In Re claim 6, Sintz et al depicts a taper (in the area of label 10) in the boundary between the outer circumferential surface and a skirt surface of the piston.

22. In Re claim 14, since the open end of the undercut of Sintz et al is at the skirt surface, it communicates with a space outwardly of the cylinder.

23. In Re claims 15, 17, 19 and 21, Sintz et al discloses four undercuts, each spaced circumferentially away from the first and second lines.

24. In Re claims 16, 18, 20 and 22, Figure 2 of Sintz et al depicts that the four undercuts (5) are equally spaced around the circumference.

25. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kojima Takeshi (Japanese Patent Publication number JP 2004027969) in view of Sintz et al (US Patent 2,702,219 A) and further in view of Helt (US Patent 6,282,910 B1).

26. In Re claim 7, Kojima modified by Sintz et al as applied to claim 1 discloses all the claimed limitations except for the motor element driven by an inverter at plural operating frequencies including an operation frequency that is at least a power supply frequency or less.

27. Nevertheless Helt discloses how power at a nominal frequency from a power supply is input to an inverter which converts that power to a reduced frequency at its

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output which is conveyed to a motor which runs at a reduced speed - Column 5, Lines 59-65: "Power at a nominal frequency from supply 27 is applied to inputs 63 and 64 of inverter 50. Inverter 50 then converts that power to create an output of a lower than nominal frequency at inverter outputs 65 and 66, which closed contacts 56 now conveys to motor input 62. The lower frequency causes blower motor 48 to run at a reduced blower speed ..".

28. It would have been obvious to a person having ordinary skill in the art at the time of the invention to incorporate the inverter and reduced frequency motor operation methodology of Helt into the motor of Kojima modified by Sintz et al as a suitable design choice for the motor apparatus and mode of operation for the purpose of providing lower flow rates when appropriate, as stated in by Helt in Column 5, line 65.

29. Claim 8 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kojima Takeshi (Japanese Patent Publication number JP 2004027969) in view of Sintz et al (US Patent 2,702,219 A) and further in view of Numoto et al (US Patent 6,082,132 A).

30. In Re claim 8, Kojima modified by Sintz et al as applied to claim 1 discloses all the claimed limitations except for the usage of R 600 a refrigerant gas.

31. However, Numoto et al discloses in Column 1 line 7 that R600a refrigerant is used in a refrigeration cycle.

32. It would have been obvious to a person having ordinary skill in the art at the time of the invention to use R 600 a refrigerant of Numoto et al in the compressor of Kojima

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modified by Sintz et al as a suitable design choice for a compressible medium that does not contribute to global warming and preserves the ozone layer as mentioned in Column 1, Lines 15-25 of Numoto et al.

Response to Arguments

33. Applicant's arguments with respect to all the claims have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

34. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Figure 5 of Oshima et al (US Patent 5,816,783 A) discloses another compressor where the piston pin is disposed parallel to the eccentric shaft.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DNYANESH KASTURE whose telephone number is (571)270-3928. The examiner can normally be reached on Mon-Fri, 9:00 AM to 4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Devon Kramer can be reached on (571) 272 - 7118. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Devon C Kramer/
Supervisory Patent Examiner, Art
Unit 3746

DGK